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ABSTRAC

A peer tutoring system was used to improve the math skills of nine eighth grade students in a mainstreaming program. Ss (whose math skill deficits ranged from 3.8 to 6.6 years) met daily with peer tutors for one half hour of instruction from the Sullivan Associates Programmed Math series. Achievement rates after 3 months ranged from 4.8 months per month of tutoring to 14.6 months per month of tutoring. (LS)

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Mainstreaming Special Education Using a Peer Tutoring System and a Minimum Objective Curriculum for Nine Eighth Grade Students

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Special education in the state of Vermont has come to include a behavioral model of "mainstreaming." Such an approach derives its name from the deliberate effort of state and local public school administrators to funnel special education with regular education.

On the local school level, the implementation of the model is facilitated by a trained professional, a certified consulting teacher. Essentially a teacher-trainer, the consulting teacher provides special education training skills to the regular classroom teacher.

This report will describe a mainstreaming of the special education of one group of nine eighth grade students whose math skills deficits ranged from 3.8 years to 6.6 years, a skills acquisition lag which rendered them all eligible for special education services. The teacher, a trainee in special education mainstreaming techniques, conducted the experiment, a practicum requirement for a graduate course offered by the school consulting teacher. All nine students received instruction within the regular school time and environment. At no time did they leave the regular learning area, nor were they instructed by special professional personnel.

Using a measurement system based on the establishment of minimum math objectives,[1] to be achieved by all students within

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[1]Burdette, C.S., Minimum Expected Objectives in the Ideal School, Burlington, Vt., Special Education Area, College of Education, University of Vermont, May, 1972.

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time lines ranging from first to beginning seventh grade, the teacher established entry level for each of the nine students. Since all of the math skills treated as minimum objectives are contained in the eight books of the Programmed Math series, the ordinate axis refers to book one, book two, etc. **See Fig. 1.**

Entry level was determined by administering to each of the nine students representative math tasks paired with each of the math skills areas outlined by the teacher in his minimum objective plan. All of the math tasks used to determine entry level were included in the Sullivan Associates Programmed Math Inventory[2] test which was completed by the nine students.

PROCEDURES

Having determined entry levels for the students, the teacher and the consulting teacher organized a peer tutoring system of instruction to be used in conjunction with the programmed math instruction built into the Sullivan Associates Programmed Math series. The series consists of workbooks for all skills areas of math. The workbooks used in this project included materials for the areas of advanced addition, subtraction, multiplication, division, fractions, decimals, and measurement. Each student began working at a place in the skills book appropriate to his math entry level.

The format of the workbook pages in the skills books is divided into two sections: Task and feedback. **See Fig. 2.**

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[2] Programmed Math, A Sullivan Associates Program. Webster Division, McGraw-Hill Book Company, New York, New York, 1968.

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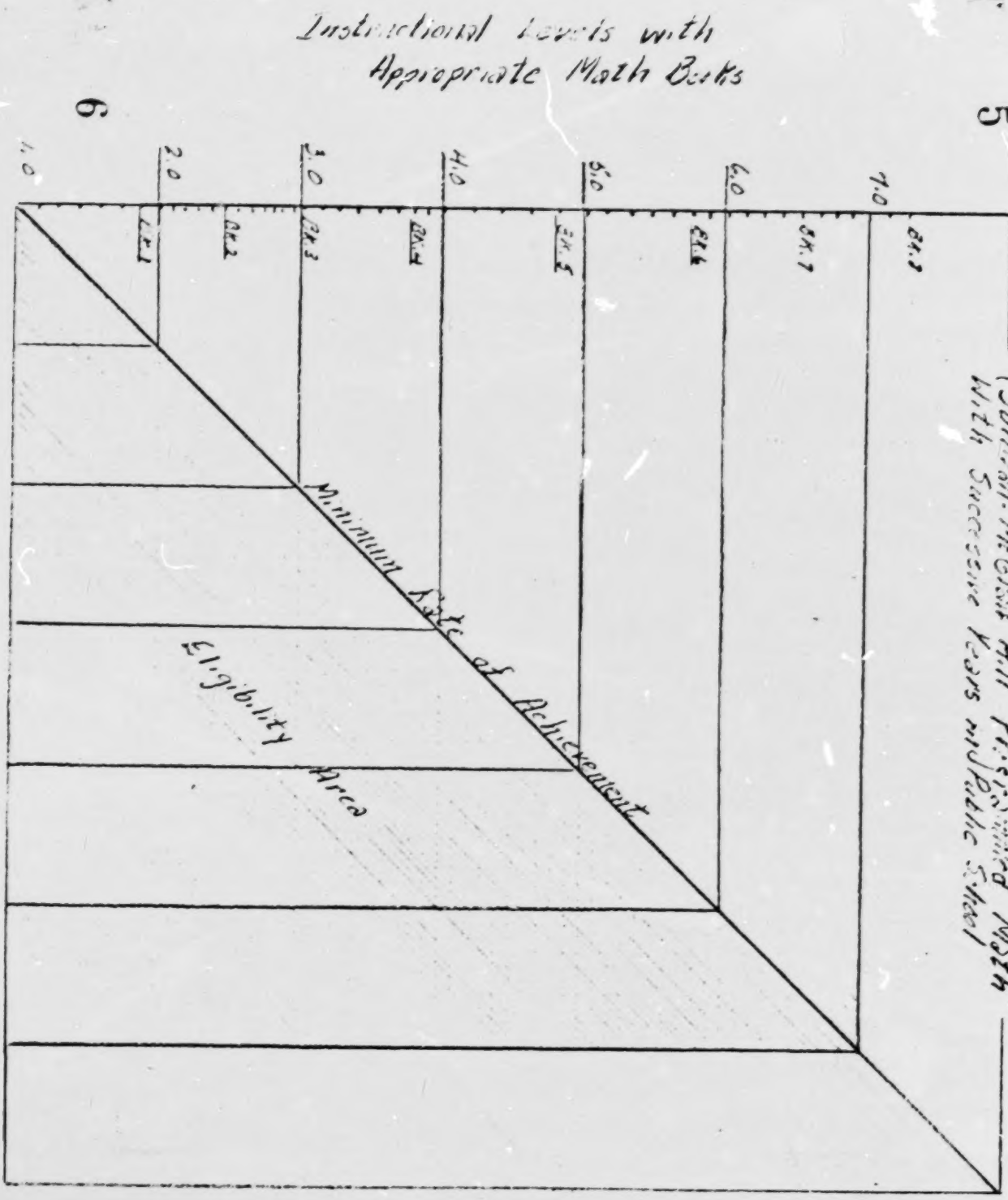

FIGURE 1

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To divide or multiply a fraction by a whole num
think of the whole number as an improper frac

$$\frac{3}{1} \times \frac{1}{4} = \frac{3}{4}$$

$\frac{2}{3}$

$$\frac{2}{1} \times \frac{1}{3} = \frac{}{3}$$

$\frac{4}{7}$

$$4 \times \frac{1}{7} = \frac{4}{}$$

$\frac{4}{5}$

$$2 \times \frac{2}{5} = \frac{}{}$$

$\frac{6}{11}$

$$3 \times \frac{2}{11} = \frac{}{}$$

$$\frac{1}{3} \div \frac{2}{1} = ?$$

Invert the improper fraction and multiply:

$\frac{1}{6}$

$$\frac{1}{3} \times \frac{1}{2} = \frac{1}{}$$

$$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$$

$$\frac{1}{4} \div \frac{3}{1} = ?$$

$$\frac{1}{4} \times \frac{1}{} = \frac{1}{12}$$

FIGURE 2

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At pre-established times each of the nine pairs of students, tutor and tutee, met daily for a half-hour of instruction. The tutor was directed by the teacher to keep the feedback column covered with a long rectangular piece of oaktak paper. Upon the tutee's completion of each math task, the tutor would slide the paper down the feedback column, revealing the correct answer to the task just completed. If the tutee's response was correct, the tutor provided reinforcement with veroal praise and a written "C" on the task; if not, the tutor then asked the tutee to rework the math task orally, citing each step. At the point in the task where the tutee computed incorrectly, the tutor would ask him/her to work that step again. If the student continued making the same error, the tutor would show him/her the correct response.

EVALUATION

In each of the math skills books, a review test occurs. Upon the successful completion of two tasks, the tutee was eligible to take a unit test which was a test separate from the book itself and which was corrected by the teacher only. Contingent on 90% success at these unit tests, the tutee moved into the succeeding pages of the workbook until he/she was ready to take the "Final Exam" of which there were two, one for each half of every skills book in the Programmed Math series.

RESULTS

Using the math minimum objective system of his own construction,

the teacher determined for each of his nine students their entry levels, rates of progress per month of instruction, and exit levels for three months, from February to May, 1974. The table below illustrates these categories of pupil performance records:

Pupil	Entry Level	Exit Level	Rate
Nora	3.60	5.90	7.7 months/month
Martin	4.80	6.25	4.8 months/month
Ruby	2.10	5.85	12.6 months/month
Rhonda	2.12	5.00	9.6 months/month
Jasper	3.75	6.40	8.8 months/month
Ernie	3.00	7.40	14.6 months/month
Walter	3.75	6.10	9.6 months/month
Josh	3.80	6.10	7.6 months/month
Mitchell	2.00	4.20	7.3 months/month

See Fig. 3

DISCUSSION

The reader of this report should bear in mind that the dramatic rates of acceleration may have much to do with the kinds of deficits in each of the skills areas. In almost all of the nine cases, the pupils had been taught, even if ineffectively, these skills at some point in the past, all of them having spent over seven years in public school. It seems reasonable to assume that they would progress more quickly with tutorial instruction than pupils who would be introduced to these math skills for the very first time.

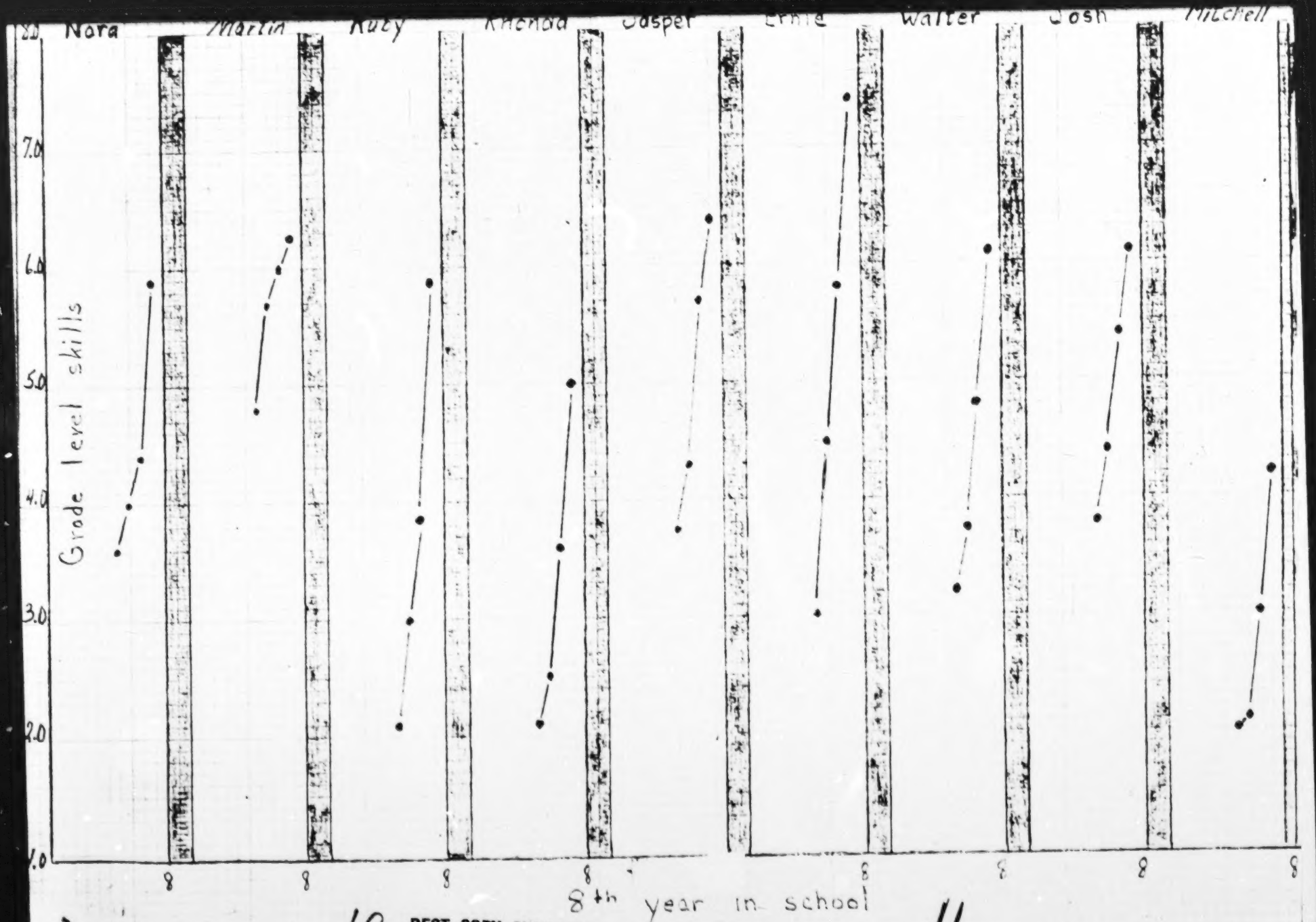

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FIGURE 3

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